

TITLE: ENVIRONMENTAL PROSPECTION OF BACTERIAL STRAINS AIMING THE DISCOVERY OF NEW LACTASE PRODUCERS

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ABSTRACT:

Lactose Intolerance (LI) is the most frequent gastrointestinal disorder, affecting 60%-70% of people worldwide. Individuals with LI have difficult to digest the lactose due an inadequate expression of the enzyme lactase (β -galactosidase), leading to abdominal discomfort (e.g., bloating, gas, and diarrhea) after ingestion of milk or dairy products. Lactose digestion can be improved by introduction of lactase tablets especially acid lactase, which is active in the stomach. Hence, the search for new enzymes with higher efficiency for application in biopharmaceuticals attracted consumer's attention. Taking this into account, the aim of the present study was to evaluate the production of lactase by lactic bacteria strains (BAL01, 02, 03, 08, 09 and 10) isolated from yoghurt, sugar cane juice and curd cheese samples. For that, the strains were tested for β -galactosidase activity by incubation at modified MRS broth with 2% lactose, instead of glucose, for 16 h, 150 rpm at 37 ° C, followed by inoculation in MRS agar with 2% lactose supplemented with 50 ng/mL 5-bromo-4-chloro-3-indoxyl- β -D-galactopyranoside (X-gal). The presence of β -galactosidase was evaluated by the appearance of blue colonies. The specific growth rates were obtained by monitoring the optical density at 600 nm and colony forming unit (cfu) by spread plate after 0, 2, 6 and 8 of growth at Erlenmeyer flasks containing 100 mL of modified MRS. Molecular identification of the selected strain were performed by the amplification and sequencing of 16S rRNA gene. All strains evaluated herein were positive for the presence of lactase in X-gal, forming blue colonies. The specific growth rates varied from 0.03 h⁻¹ (BAL10) to 0.4 h⁻¹ (BAL02). BAL02 was selected and molecularly identified showing 100% identity to *Lactobacillus plantarum*. The results so far are very promising both for direct use of BAL02 as probiotic and for the purification of its lactase.

Keywords: *Lactobacillus plantarum*, lactase, lactose intolerance, gastrointestinal disorder.

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